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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,178	02/03/2006	Erlind M. Thorsteinson	62562A	6741
35503 7590 02/13/2009 Union Carbide Chemicals and Plastics Technology Corporation P.O. Box 1967 Midland, MI 48641-1967				
EXAMINER				
MICALL, JOSEPH				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/567,178

Applicant(s)

THORSTEINSON ET AL.

Examiner

JOSEPH V. MICALI

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 13-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 13-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SI/08)
Paper No(s)/Mail Date 10/7/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendment filed January 13th, 2009 has been entered. Claims 1-10 and 13-15 remain pending in the application. The previous objection to the specification and 35 U.S.C. 112 rejection on claim 13 are withdrawn in light of applicant's amendments.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1, 5-7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,733,842 by Gerdes et al, with motivation additionally supplied by US Patent No. 6,802,878 by Monroe.

With respect to claim 1, Gerdes recites a method of preparing a catalyst carrier by providing a mixture of components with at least one modifier selected from alkaline earth silicates and shaping to form an alpha-alumina carrier precursor (**claim 1, column 11, line 60 – column 12, line 8**). Gerdes also recites drying the carrier (**claim 1, column 12, lines 9-10**). Gerdes also recites calcining the dried carrier (**claim 1, column 12, lines 11-12**), where "firing" is synonymous with "calcining" as stated in the specification of Gerdes (**column 5, line 39 – column 6, line 5**).

Gerdes does not claim the impregnation of a preformed alpha-alumina carrier, subjected to calcining; however, Gerdes explicitly teaches that the catalyst carrier may comprise a number of other ceramic-forming component, such as titania, and that such a component may be added in the initial mixture or may be added to the porous calcined carrier by impregnation (**column 5, lines 28-36**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form an alpha-alumina carrier and subsequently impregnate following calcination, in view of the entire teaching of Gerdes. The suggestion or motivation is evidenced, both in Gerdes and evidentiary document to Monroe, to use a known technique to yield predictable results with expected success since it is known to add modifiers by impregnation subsequent to drying and calcining (**Monroe, column 1, lines 39-42**).

With respect to claim 5, Gerdes recites a method, shown above with respect to claim 1, with the additional step of preparing a catalyst after forming the carrier by depositing silver catalytic material (**column 7, line 66 – column 8, line 19**).

With respect to claim 6 and 7, Gerdes recites at least one efficiency enhancing promoter selected from a group consisting of at least one alkali metal, alkaline earth metal, or oxyanion of an element (other than oxygen) having an atomic number of 5 to 83 and being selected from groups 3b through 7b and 3a through 7a of the periodic table deposited on the preformed alpha-alumina (**claim 1, column 11, line 60 – column 12, line 8**).

With respect to claim 10, Gerdes recites a method of preparing a catalyst carrier or catalyst where the alkene is ethylene (**column 7, line 62 – column 8, line 7**).

5. Claim 2-3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerdes et al (US'842), in view of EP 1086743 by Mikawa et al.

Gerdes' teaching is mentioned above in 103 rejection (supra).

With respect to claims 2-3, Gerdes further teaches a method of making a porous catalyst carrier comprising the steps of impregnating a preformed alpha-alumina carrier with alkaline earth metal silicate modifier, drying the impregnated carrier, and calcining the dried carrier.

However, Gerdes does not teach the selection of a modifier from the group of sodium silicates, lithium silicates, and potassium silicates, or mixtures thereof. Furthermore, it does not teach a sodium silicate modifier with stoichiometry, $\text{Na}_2\text{O}-2.6\text{SiO}_2$.

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Mikawa teaches a method of making a catalyst for the production of epoxides by a vapor-phase oxidation of an unsaturated hydrocarbon, wherein a sodium silicate modifier along with an alpha-alumina carrier is used (**claim 8**). The modifier may be sodium silicate with a stoichiometry of $\text{Na}_2\text{O} \cdot 2.6\text{SiO}_2$ (**claim 4**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the method of Gerdes using sodium silicates (alkali metal silicates) in place of magnesium and calcium silicates (alkaline metal silicates). The suggestion or motivation for doing so would have been to provide a functional equivalent and “express suggestion to substitute one equivalent for another need not be present to render such substitution obvious” as stated in **MPEP 2143(B)**.

With respect to claim 15, Gerdes explicitly teaches a method that ends with the calcination of the dried carrier

Gerdes does not expressly teach that the carrier is washed after calcination.

Mikawa teaches washing a modified carrier after calcination (**example 1 of Mikawa, page 11, lines 13-15**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the process set forth by Gerdes including a washing step after calcination. The suggestion or motivation to do so would have been to remove impurities from the carrier.

6. Claim 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerdes et al (US'842), in view of EP 1086743 by Mikawa et al, as applied to claims 2-3 above, and further in view of US Patent No. 5,187,140 by Thorsteinson et al.

With respect to claims 13-14, Gerdes teaches an alpha-alumina carrier of platelet morphology (**column 5, lines 39-43**) with alumina at least 95% by weight (**first table of column 7**), with a surface area at least $0.5 \text{ m}^2/\text{g}$ (**column 5, lines 58-62**) and a pore volume at least 0.5 cc/g (**column 5, lines 58-62**).

Gerdes doesn't explicitly teach a median pore diameter between about 1 to 25 microns, nor the alumina itself having an interlocking platelet morphology (rather than the carrier).

Thorsteinson recites a carrier where carrier particles having a particle size greater than about 0.1 microns, a substantially flat major surface of platelet-type morphology, where with the platelet-type morphology, a pore diameter is less than 50 microns, preferably less than 20 microns (**column 8, lines 43-59, and Table A**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the process set forth by Gerdes using the specified median pore diameter and morphology. The suggestion or motivation to do so would have been to specify a pore diameter required by Gerdes but not disclosed, and use of a known technique in the art to produce predictable results with an expectation of success with regards to known particle morphologies.

With respect to claim 14, see "With respect to claims 2-3."

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,733,842 by Gerdes et al, in view of US Patent No. 6,103,916 by Takada et al.

With respect to claim 4, Gerdes teaches a method of making a porous catalyst carrier comprising the steps of impregnating a preformed alpha-alumina carrier with

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alkaline earth metal silicate modifier, drying the impregnated carrier, and calcining the dried carrier.

Gerdes does not teach a drying conducted at a temperature not exceeding about 250°C for at least the first two hours following impregnation.

Takada is drawn to an alpha-alumina silver catalyst for the production of ethylene oxide and the method of production.

Takada teaches a drying following impregnation at a temperature range of 100-400°C (**claim 8**), and specifically, a drying not exceeding 250°C for two hours (**column 3, lines 39-51**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the method of Gerdes including the drying being performed at 250°C in view of Takada. The suggestion or motivation for doing so would have been to provide an operating temperature required by Gerdes but not disclosed.

8. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Gerdes et al (US'842), in view of EP 0480537 by Thorsteinson et al, with motivation additionally supplied by US Patent No. 5,440,058 to Hoffman et al.

With respect to claims 8-9, Gerdes teaches a method of making a porous catalyst carrier comprising the steps of impregnating a preformed alpha-alumina carrier with alkaline earth metal silicate modifier, drying the impregnated carrier, and calcining the dried carrier. It also teaches at least one efficiency enhancing promoter deposited on the preformed alpha-alumina.

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Gerdes does not explicitly teach an efficiency enhancing promoter being a salt of a member of a redox-half reaction pair, nor a specific promoter component including rhenium.

Thorsteinson is drawn to a stable alkylene oxide catalyst, with shared inventors of the current application

Thorsteinson recites the inclusion of an efficiency enhancing promoter being a salt of a member of a redox-half reaction pair (**claim 1**) as well as rhenium (**claim 1**).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the method of Gerdes with the addition of a salt of member of a redox-half reaction pair or a rhenium component as an efficiency enhancing promoter. The suggestion or motivation to make this connection is to improve vapor phase epoxidation (US Patent No. 5,440,058 to Hoffman et al, column 3, line 57 – column 4, line 12).

Response to Arguments

2. Applicant's arguments, filed January 13th, 2009, with respect to the rejection(s) of claim(s) 1-10 and 13-15 under 102(b) and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of only 103(a).
3. With regards to claims 1, 5-7, and 10, examiner has amended his rejection to take into account the limitation of "impregnating a preformed alpha-alumina carrier." While the claimed process of Gerdes is drawn to form a carrier from a mixture already containing modifiers rather than impregnating the preformed carrier with modifiers, as applicant has acknowledged in response, Gerdes does allow for modifiers to be added

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post-formation by impregnation, such as titania. Thus, Gerdes now stands as a 103(a) obviousness rejection over the instant claims, shown in the rejection above.

4. With regards to the rest of the instant claims where the issue of a preformed carrier has been raised (claims 2-4 and 8-9), the new Gerdes rejection is now shown to encapsulate the subject matter and stands as covering the limitation.

5. Also, with regards to claim 1, applicant raises the issue of Gerdes not teaching or disclosing the production of ethylene oxide using a catalyst support by the preformed carrier. If the issue is with respect to the preformed carrier, see above statement, but if the issue is with the teaching, examiner maintains that Gerdes does teach such a limitation, even though there is no mention of it in instant claim 1; however, claim 10 does mention the limitation, and the rejection by Gerdes stands.

6. With regards to claims 13-14, examiner has amended his rejection to take into account the alpha-alumina particles having the platelet-type morphology, rather than the carrier mass being shaped.

7. Also, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the addition of the Thorsteinson teaching provides the missing property (diameter), along with the appropriate product (preformed alpha-alumina carrier). See new rejection.

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8. With regards to claim 4, examiner maintains the use of Takada, as one having ordinary skill in the art at the time the invention was made would appreciate that one would dry a carrier following impregnation, whether it be to produce an intermediate or final product and regardless of the type of addition.

9. With regards to claims 8-9, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the addition of the Hoffman teaching provides motivation to combine, and examiner maintains his rejection.

Conclusion

10. Claims 1-10 and 13-15 are not allowed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH V. MICALI whose telephone number is (571)270-5906. The examiner can normally be reached on Monday through Friday, 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, VICKIE KIM can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JOSEPH V MICALI/
Examiner, Art Unit 4181
/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4181